

Voters' versus Policymakers' Attitudes Towards Unemployment and Inflation

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Abstract: Working with a sample of 13 European nations from 1960 to 1997, this paper compares voters' and policymakers' attitudes towards unemployment and inflation. It is thought that policymakers' beliefs about the behavior of the economy play an important role in determining electoral results since they influence voters' perceptions of what macroeconomic policy can achieve and which objectives it should pursue. Empirical work on vote functions shows that inflation is the most important determinant of electoral results and unemployment is the least important. Reasons for the emergence of a neo-liberal consensus among European policymakers are discussed and empirically tested. The spread of these conservative ideas and the willingness to achieve a monetary union are suggested as possible explanations for why governments go unpunished for the increase and persistence of unemployment in Europe.

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1 Introduction¹

This paper compares voters' and policymakers' attitudes towards unemployment and inflation in the last four decades of European history. Through this period the state of the European economic situation has changed considerably and important institutional changes have transformed the constraints faced by policymakers. Three main topics will be discussed.

The first has to do with the increase in unemployment after the first oil shock. In the 1960's European unemployment rates were very low, but they increased considerably after the first oil shock and have been persistently high since then. In fact, average unemployment for European Union (E.U.) countries is currently above 10%, while inflation has returned to levels similar to the 1960's. Whether this shift in unemployment and inflation performance has been accompanied by political repercussions for incumbent politicians is a question of interest. Did voters punish governments for rising levels of unemployment and reward them for decreasing inflation? Did the increase and persistence of unemployment lead to a switch to the left in voters' ideological preferences, as partisan theory predicts? The second topic concerns the series of institutional changes that Europe has been passing through in order to achieve economic integration. Integration reduces the power of governments to act independently in response to country-specific macroeconomic shocks. Whether voters were aware of the new policy constraints and took them into account in their electoral choices is another question under study. In order to answer these first two questions voting functions were estimated for a panel of 13 E.U. countries from 1960 to 1997. The analysis extends results obtained by Chappell and Veiga (1999).

The third topic concerns the desire to create a monetary union, which by limiting policymakers' economic policy tools, decreases their abilities to use macroeconomic policy to pursue domestic objectives and to differentiate themselves in the electors' perceptions. It is therefore puzzling to see political actors from different ideologies favoring the creation of a monetary union. Following McNamara (1998), I will argue that the creation of a neo-liberal consensus among the

¹ I acknowledge helpful comments from Henry Chappell Jr. and McKinley Blackburn. Financial support was provided by the PRAXIS-XXI program, Fundação para a Ciência e a Tecnologia - Portugal.

leaders of European countries is a key to explaining the success in European integration. To investigate whether adopted monetary policy responses to inflation or unemployment shocks have changed over time, monetary policy reaction functions with time-varying parameters were estimated for the U.S. and Germany. These two countries have strong independent central banks and great influence on World and, especially, European monetary conditions. For the other E.U. countries in the sample, an analysis of real short-term interest rates behavior over time was performed.

The essay is divided into two sections. The first one investigates voters' attitudes towards unemployment and inflation, while the second focuses on policymakers. Finally, conclusions are presented comparing the two groups' attitudes.

2 Electoral Results and the European Economic Situation

From 1950 to 1970 all major industrialized economies were near full employment. However, after the first oil shock unemployment increased in most countries, particularly within the European Union. Figure 1 reports country statistics, for average unemployment by decades. All reported nations suffered increases in unemployment in the 70's and 80's, with average unemployment for the fifteen E.U. countries doubling from one decade to the other. In the 90's Belgium, Denmark, Ireland, Netherlands, Portugal, and the U.K. managed to slightly reduce it, but unemployment in the other E.U. countries rose and average unemployment for the fifteen nations increased.

[Figure 1]

However, inflation rates (see Figure 2 below) behaved in the opposite direction. They suffered a major increase in the 1970's mainly due to the oil shocks, but have been continuously decreasing since then. In fact, for all reported countries except Italy and Portugal, average inflation in the 1990's was lower than in the 1960's.

[Figure 2]

Although voters are not expected to know exactly how to solve the economic problems that affect them, they are expected to react to economic changes and express their opinions about policymakers through voting. Thus, one would predict that incumbents would be rewarded for

decreasing inflation and punished for rising unemployment. Furthermore, partisan theory (Swank, 1993, 1998) would predict that right-wing governments would be punished more heavily for increases in unemployment than left-wing governments, and the reverse for inflation.

Visser and Wijnhoven (1990) analyzed these questions and concluded that conservative governments were not punished for mass unemployment in Europe during the 1980s'. They argue that ideological discourse played an important role in this process, since by developing a notion of "what is good/bad" and "what is (im)possible," parties influenced voters' perceptions and values. They suggest that since incumbent parties are not forced to change their policies due to mass unemployment, mass unemployment may become permanent. Their prediction seems to have been correct since during the 1990's no major reductions occurred in European unemployment.

In what follows, I try to understand the determinants of electoral results in European Union countries by modeling and estimating an aggregate voting model that takes into account partisan considerations, and the possibility that standards of evaluation may have changed over time.

2.1 *The Empirical Model*

The starting point for the literature on vote and popularity functions is the proposition that voters hold the government responsible for economic conditions. This idea was first introduced by Downs (1957), who hypothesized that voters assess expected future utilities under competing candidates, and that the popularity of the incumbent is a positive function of assessments of his performance. The number of publications on this topic is considerable, adding new insights into the subject. Good reviews of the early literature can be found in Lewis-Beck (1988), Mueller (1989: 280-84), and Nannestad and Paldam (1994).

The voting functions estimated in this paper are of the following form:

$$\text{Equation 1} \quad DV_{it} = \alpha_0 + \alpha_1 VPREV_{it} + \alpha_2 TIMEG_{it} + bE(x_{it}) + u_t$$

The dependent variable consists of the election to election change in the percentage of votes received by incumbent parties in country i at time t . The underlying idea is that changes in votes for incumbents are a function of their vote share in the previous elections ($VPREV_{it}$), their time in office

($TIMEG_{it}$), and overall economic performance [$E(x_{it})$]. Economic performance can be measured by multiple variables, including changes in unemployment, changes inflation, real GDP growth and real private consumption growth, or changes of these variables when expressed as deviations from the European average.¹

Previous studies of voting functions using panel data have measured economic variables as four-quarter averages or include a few lags of them. This implies that voters do not take into account the evolution of economic series during the first years of incumbency.² Although it is possible that voters have short memories, this is a point that deserves further investigation. In this essay, economic performance is alternatively measured over the last year of a government's term and over the entire period a government has been in office.

The percentage of votes obtained by incumbent parties when previously elected is included as an independent variable since governments with higher initial support are likely to have stronger erosion of their images. The same is true for governments that stayed longer in office. Thus, negative signs for estimated coefficients on these variables are expected. Regarding economic performance, estimated coefficients are expected to be negative for unemployment and inflation and positive for real GDP growth rate and real private consumption growth.

This paper also analyzes whether ideological issues influence voters' assessments of incumbents' economic performance. Partisan theory was introduced by Hibbs (1977)³ and is based on the hypothesis that politics is about the distribution of income (Hibbs and Dennis, 1988), in the sense that parties in office manipulate the economy in order to favor their constituencies. It assumes that the

¹ Chappell and Veiga (1999) have analyzed the issue of how to measure standards of economic performance. They argue that although voters are concerned with growth, unemployment and inflation, good economic performance should be judged in relation to what is feasible, as well as what is desirable. They evaluated a variety of economic performance indicators as explanatory variables for election outcomes in order to learn what macroeconomic theories are most consistent with voters' choices. Their results indicated that simpler measures of economic performance such as changes in national series or performance relative to the European average performed best. Therefore, in this study only these measures are considered.

² If true, this would give incumbents an incentive to manipulate the economy before elections, generating a Nordhaus' political business cycle (Nordhaus, 1975).

³ See also Hibbs (1987, 1994) for further extensions, and Hibbs (1992) for a survey of partisan theory. Alesina (1987), and Chappell and Keech (1986) refined Hibbs' partisan theory by introducing rational expectations in the analysis.

lower classes of the population are mainly supporters of left-wing parties, and that they are more averse to unemployment and less averse to inflation than the richer classes of the population which tend to support right-wing parties.

Although partisan effects in macroeconomic outcomes such as unemployment, inflation, and growth have been tested by several authors,⁴ the theory has evolved as a separate stream from the voting functions literature. In fact, there is not much research in economic literature that incorporates partisan theory in voting models. Swank (1993, 1998) developed a voter model where voters' choices reflect understanding of partisan reputation for certain policies. The underlying idea is that when unemployment increases, the demand for expansionary policies rises, turning left-wing policy proposals more attractive. The reverse occurs when inflation increases, generating more support for conservative policies. Using Gallup Poll approval data for the U.S. Swank found strong support for his model.

In a situation of rising and persistent unemployment one would therefore predict an increase in left-wing governments in Europe. In order to take ideological issues into account, a dummy equal to one when a right-wing government is in office and zero otherwise was included in the model both independently and interacted with each economic variable. A positive sign is expected on the interaction variables with inflation and growth, while a negative sign is expected for the interaction variable with unemployment.

Another issue not analyzed in Chappell and Veiga (1999) and emphasized in this one, is the stability of parameters over time. This is important since I am dealing with long time series, which cover almost four decades of data. Furthermore, one of this paper's goals is to analyze whether voters' concerns with unemployment and inflation have changed over time, and to determine whether the institutional changes that European countries have implemented in the process of forming a monetary union have changed the way voters hold incumbents responsible for macroeconomic outcomes.

⁴ See, among others, Alesina, Cohen, and Roubini (1997) for tests of political business cycles in industrialized economies.

In sum, I am particularly interested in investigating: (1) whether governments are held responsible for macroeconomic outcomes, namely unemployment, inflation, real GDP growth and real private consumption; (2) if governments' ideologies influence voters' assessments of incumbents' macroeconomic performances; (3) whether the way voters hold governments responsible for economic conditions has changed over time.

2.2 *Empirical Work: Voting functions*

This section describes the data set used to estimate voting functions and presents empirical results for alternative specifications.

2.2.1 *The Data Set*

The analysis uses a data set covering 136 parliamentary elections in 13 European nations (Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, and the United Kingdom) from 1960 to 1997. Political data consists of parliamentary election results, namely votes received by incumbent parties, time in office, governments' ideological orientations, and the number of parties forming a government.⁵ Since unstable governments are less likely to be held responsible for macroeconomic results, only elections separated by at least one year and governments that did not change composition in the previous year before an election were included in the sample used for estimation. This decision resulted in the exclusion of nine elections. Caretaker governments formed to rule during political crises were excluded from the sample.

Economic data consists of unemployment, inflation, growth of GDP and growth of private consumption. Unemployment series were obtained from OECD-MEI, all other series were collected from the IMF-IFS.

⁵ Details of the political data are available from the author upon request.

2.2.2 *Empirical Results*

This section starts by comparing results for vote function specifications that use indicators of economic performance measured over the last four quarters of incumbency with results obtained for specifications using averages over the entire term. Subsequently partisan and time considerations are introduced into the analysis.

Controls for country fixed effects were performed by including a constant and dummies for each individual country except one. For all regressions, an F-test for the coefficients for the dummies was performed to determine if these coefficient estimates were jointly statistically significant. In most regressions I could reject the hypothesis that these dummy variables were jointly equal to zero. Therefore, although the coefficients on the dummies were not reported on the tables, a fixed-effects model was estimated.

Economic Variables and Electoral Results

Table 1 presents results for specifications where economic variables are measured alternatively as four-quarter averages of changes in national performance or changes in performance relative to the E.U. average. Both the percentage of votes for incumbents when previously elected and the number of quarters in office are statistically significant and negatively affect the change in vote share for incumbents. This is in accordance with the idea that governments with a higher base and longer time in office have higher costs of ruling. Among the economic variables, changes in inflation, especially when measured relative to the European average, appear as the main economic determinant of electoral results. Among real variables, only real GDP growth is marginally significant and correctly signed in the second specification.

[Table 1]

Since voters are likely to take into account not only the year before an election but the entire period a government has been in office, economic performance was alternatively measured over the entire term. Results presented in Table 2 indicate that voters reward governments for increases in real GDP and real private consumption but don't hold them responsible for inflation or unemployment. These results, when compared with the previous ones, suggest that voters have short memories of

inflation. Voters hold governments responsible for real GDP growth and real private consumption growth over the entire term, not just for the last year in office; and the opposite occurs with inflation. Possible explanations are that real conditions take longer than nominal conditions to be perceived by voters or that inflation responds to policy with a longer lag and therefore, voters do not hold incumbents responsible for it in the early quarters of an administration.

[Table 2]

Right versus Left-Wing Governments

To test whether voters hold conservative governments more responsible for certain economic variables than left-wing governments, a dummy equal to one for right-wing governments and zero otherwise, as well as interactions of this dummy with the economic variables were added to the model. The model was again estimated using averages of economic performance over the last 4 quarters and all quarters in office. Results did not generate any clear evidence that voters hold incumbents from different ideologies more responsible for some economic variables than others. Splitting the sample between left and right wing oriented governments stressed this finding. I therefore conclude that the evidence does not establish the existence of partisan effects in European electoral results.

Structural Breaks in Parameter Estimates

Because the sample is long, including almost four decades of data, tests for structural breaks in parameter estimates were performed. Breaks were considered first according to the history of European unification and then, according to the behavior of economic variables.

Having in mind that the European integration process may have decreased (increased) governments' responsibility for national (relative) economic conditions in voters' eyes, I start by analyzing two dates: 1979 and 1989. It is thought that the degree of political manipulation of the economy may have fallen in the 1980's due to the creation of the European Monetary System (1979), which instituted a system of semi-pegging parities among its participants. The beginning, in 1989, of the first stage of the creation of a monetary union may also have had an impact on the extent to which

voters hold governments responsible for economic conditions. This stage had as main objectives the removal of all capital controls, the reduction of inflation and interest rate differentials among member states, an increase in exchange rate stability in the European Monetary System (E.M.S.), and an increase in policy coordination. To test these hypotheses, interactions of time dummies (1979:Q1 to 1988:Q4; 1989:Q1 to 1997:Q4) with the economic variables were included in the model. Results suggest voters' perceptions of incumbents' responsibility did not change with the process of European integration.

Tests for structural breaks were also performed based on economic series behavior. The underlying argument is that the electorate may hold incumbents more responsible for a certain economic variable when that variable moves beyond acceptable levels. Three splits were considered based on the levels (5%, 7% and 9%) of average European unemployment and inflation. Results were mainly negative, suggesting that the degree of governments' responsibility for economic conditions in voters' eyes did not vary over time.

3 Policymakers' Beliefs About the Behavior of the Economy

Empirical results suggest that European voters punish governments for increases in inflation, especially when measured relatively to the European average, and reward them for real GDP growth. The macroeconomic series that appears fewer times as statistically significant in estimated vote functions is unemployment. Why do European voters appear so unconcerned with unemployment? Why don't they punish policymakers for its increase, especially when other industrialized nation like the U.S. and Japan do not suffer from the same problem?

To understand why voters seem so unconcerned with unemployment it is important to analyze policymakers' beliefs about the behavior of the economy and the capacity of adopted macroeconomic policies to have real effects. In my opinion, the change in policymakers' attitudes from Keynesian interventionist ideas, to neo-liberal beliefs that attribute a lower level of responsibility to governments for economic outcomes, especially unemployment, is a possible explanation for why voters do not punish governments for rising unemployment. This change in attitudes may also be associated with

the success of European economic integration, which in turn made the need to adopt conservative policies even stronger. The creation of a monetary union limits governments' economic policy tools and consequently their abilities to use macroeconomic policy to pursue domestic objectives. In fact, since macroeconomic policy is directly linked to the ideologies and programs of each political party, it is puzzling why political actors from left to right, in a situation of high and persistent unemployment, favor the creation of a monetary union that decreases their abilities to differentiate themselves in the electors' perceptions.

According to McNamara (1998), the creation of a consensus on conservative policies among the leaders of European states in the 1970's is a major point to understanding European monetary cooperation.⁶ She suggests three reasons for the development of this neo-liberal consensus. First, the failure of Keynesian interventionist policies after the first oil shock. Second, the development of monetarist ideas as a viable alternative to end stagflation. Third, the example of Germany, which by adopting conservative monetarist policies managed to overcome the economic problems created by the oil shocks better than any other European state. In the authors' opinion these three points were in fact relevant. However, the U.S. experience was also seen by European leaders as an example to follow. The U.S. managed to overcome stagflation better than the average western European countries by adopting conservative policies. Furthermore, it has an independent central bank.

The failure of Keynesian policies after the oil shock of 1973 reopened the debate on how the economy works and the role of the government in the macroeconomy, creating conditions facilitating the appearance of a new paradigm. A situation of high inflation, slow growth and rising unemployment, could not be solved through expansionary macroeconomic policies and reflected the breakdown of the Phillips curve, which had served as a policy guide in previous years. The

⁶ Collins and Giavazzi (1993) also tried to understand the E.M.S. success. They argue that private sector attitudes towards unemployment and inflation have shifted within E.M.S. members. They argue, in particular, that during the 1980's traditionally high-inflation countries became less tolerant of inflation relatively to unemployment, while the reverse occurred in states that initially had low-inflation rates. The development of common attitudes toward inflation and unemployment facilitated convergence in inflationary performance, therefore contributing to the E.M.S. success. Common attitudes toward inflation are a necessary condition for the viability of a fixed exchange rate system.

diminishing effectiveness of Keynesian monetary policies may have increased governments' desires to subordinate monetary policy to the constraints of exchange rate cooperation.

Monetarist ideas constituted an appealing framework by making anti-inflationary policies a priority rather than employment and growth objectives. They provided an explanation for stagflation as well as the breakdown of the Phillips curve, and they advocated less intervention of the government in the economy. According to the monetarist policy viewpoint each economy has a “non-accelerating inflation rate of unemployment” (NAIRU), which is independent of the rate of inflation and therefore, unaffected by monetary policy (Friedman, 1968). Although monetarist ideas were developed in an environment of adaptive expectations, the rational expectations revolution strengthened this point (Lucas, 1973). In a situation of increasing levels of inflation, rational workers and employers begin to expect inflation and take it into account in their decisions about prices and wages. Attempts to “fine-tune” the economy were thought likely to increase the variability of output rather than decrease. Therefore, policymakers should simply adopt credible anti-inflationary policies to restrain inflationary expectations. A stable, predictable growth of the money supply was viewed as the best way to reduce inflation and achieve economic growth. Most European countries started adopting monetary targeting by the mid-1970's.⁷ However, besides adopting monetary targets, governments viewed the fixing of their exchange rates as another way to reinforce their ability to reduce inflation. Moreover, the reduction of unemployment was only considered to be possible by the adoption of supply-side policies, aimed at the elimination of structural problems.

Although monetarist theory was subject to some critiques in the second half of the 1980's due to difficulties in accurately controlling the money supply and doubts about the links between the money supply and inflation, the lack of a reliable alternative to it lessened the impact of the critiques. In fact, the situation of crisis created a perfect environment for European governments to implement reforms without suffering significant opposition from those groups of society that traditionally oppose austerity measures.

⁷ See OECD, “Monetary Targets and Inflation Control,” *Monetary Studies Series* (Paris: OECD, 1979).

Third, Germany's success in fighting inflation with a strong and independent central bank that adopted restrictive, well-informed, monetary policies and defended a strong currency constituted an example to follow. The *Bundesbank* kept interest rates high, and in 1974, began announcing monetary aggregate targets. It played a leading role in fighting inflation. Germany stood out as the most successful European country in solving the problems created by the oil crisis, and was thus generally viewed by the European leaders as an example of monetarist policies, worth following after an experience with Keynesian policy failure.

Finally, when comparing E.U. and U.S. macroeconomic performance in the last 40 years it is clear that they both had low levels of inflation and unemployment in the 60's, and that during the 70's there was a big increase on inflation, mainly due to the oil shocks. However, during the 80's and 90's the U.S. managed to substantially decrease inflation and unemployment rates, while Europe was only able to decrease inflation. The U.S. success in overcoming stagflation was achieved with conservative macroeconomic policies, and reliance on free market principles.⁸ Furthermore, the U.S., like Germany, has one of the most independent central banks. Therefore, the U.S. experience may also have constituted an example to imitate.

These four points certainly contributed to the creation of a conservative consensus among European policymakers, which was critically important to the maintenance of the European Monetary System⁹ and the revival of the European Monetary Union (E.M.U.) project. The E.M.U. was proposed in 1989 in the Delors Report and the phases for the transition to European Union were later established in the Maastrich treaty. The criteria countries had to fulfill in order to pass the last phase clearly reflected conservative monetarist ideas. For the E.M.U. to succeed, governments had to

⁸ Refer to Palley (1996) for the change in attitudes from Keynesian interventionist ideas to monetarist policies in the U.S..

⁹ Increasing the credibility of the E.M.S. as an institution was critical for success in reducing inflation, which in turn contributed to the reinforcement of conservative ideas. To understand why the E.M.S. contributed to success in reducing inflation, one should recall the "time-inconsistency problem" first illustrated by Kydland and Prescott (1977). With rational agents, anticipated expansionary monetary policies do not have real impacts, however if increases in the money supply are not fully anticipated they generate real impacts until expectational errors are corrected. Therefore, governments could be tempted to adopt one-shot expansionary policies. Rational agents, by understanding this incentive, take it into account in their expectations, which, by itself, creates inflation. By participating in the E.M.S. governments increase their credibility to fight inflation. Thus, the E.M.S. contributed to the reinforcement of conservative macroeconomic ideas introduced after the oil shocks.

consider exchange rate stability and inflation controls as primary goals. Consequently, governments had to abdicate from the use of monetary policy to fight national problems such as unemployment and slow growth. Therefore, levels of unemployment that would have been considered unacceptable some years ago are now considered “normal” and this conservative orthodoxy seems to be shared from the left to the right alike in Europe. Although unemployment is a serious problem in European economies, the need to reduce inflation and budget deficits in order to fulfill Maastricht criteria for economic integration had higher priority.

3.1 Testing the Creation of a Conservative Consensus on Monetary Policy

As has been said above, for European integration to succeed governments had to consider exchange rate stability and inflation controls as their primary goals. They abdicated from using monetary policy to stabilize real national variables and have kept real interest rates high in an era of low inflation.¹⁰ The purpose of this sub-section is to investigate the empirical foundations of these arguments. I start by presenting evidence for the two countries (U.S. and Germany) that have been hypothesized to be the providers of successful conservative monetary policies, that later spread to other E.U. nations. I subsequently extend the analysis to the other countries.

3.1.1 U.S. and Germany

Figure 3 illustrates inflation and short-term nominal interest rates for the U.S. and Germany. In both countries, real interest rates were low during the sixties. The increase in inflation in the seventies led to the adoption of high real interest rate policies. These policies have continued thereafter even though we are now in an era of low inflation. Furthermore, the U.S. managed to reduce unemployment simultaneously with inflation, but Germany and the other E.U. countries did not.

[Figure 3]

¹⁰ See Blinder (1998) Lionel Robbins Memorial Lectures for a digression on central banking. Blinder (1998, pp. 41) states: “the monetary authorities of many countries, especially in Europe, have displayed a willingness to maintain their tough anti-inflation stances to this very day, despite low inflation and persistently high unemployment.”

To find out if monetary policy responses to the state of the economy have changed over time, time-varying parameter monetary policy reaction functions were estimated for the U.S. and Germany, from the 1960's to 1998.¹¹

Changes over time in policy responses to the economy could have several causes. A first reason relies on the historical evolution of macroeconomic thought. Because adopted policies reflect the dominant macroeconomic paradigm, solutions for economic problems may vary over time. A second reason focuses on the individuals who define monetary policy, and on those who can exert influence over them. Different individuals have different preferences thus, changes in monetary policy may occur if the individuals responsible for policy making change.

In the U.S., several authors have documented the existence of temporal instability in reaction function parameter estimates. Most papers focus on the second reason noted above to justify parameter instability over time. In the U.S. four levels of individuals are relevant to the process of monetary policy-making: the chairman of the Federal Open Market Committee (FOMC), the other members of the Committee, the President and the Congress.¹² Papers focusing on the first reason for parameter instability over time are scarcer.¹³

To estimate the time-varying parameter model three approaches were possible. First, one could estimate the model for sub-samples of the period analyzed and to test for structural breaks in parameter estimates.¹⁴ Second, one could estimate a recursive autoregressive model,¹⁵ which adds a

¹¹ All variables used to estimate monetary policy reaction functions are measured monthly and seasonally adjusted. The U.S. sample starts in January 1960 and ends in July 1998, while the Germany sample starts in January 1962 and ends in March 1998.

¹² Because different chairmen may advocate differing operating procedures, Hakes (1990) formally tested for breaks in parameter estimates for different chairmen. He found a break from Martin to Burns and from Burns to Volcker. He considers the Martin and Volcker periods nearly indistinguishable. Hakes' results also suggest that presidential administrations have an impact on the formation of monetary policy. In a later paper Gamber, Hakes and Shen (1998) found that during the Martin, Burns and Miller chairmanships the primary concern of the Federal Reserve was unemployment, while in the Greenspan period it is inflation. Other papers, namely Alesina and Sachs (1988), Beck (1982), Chappell and Keech (1986, 1988), Chappell, Havrilesky and McGregor (1993), Havrilesky (1987) and Hibbs (1987) analyzed partisan influences on the Federal Reserve.

¹³ Brayton, Levin and Tryon (1997) and Reifschneider and Stockton (1997) described the evolution of macroeconomic and econometric models adopted by the Federal Reserve Board but did not explicitly analyze their impact on reaction function coefficients. Taylor (1998) examines U.S. monetary history, from 1879 to 1997, in order to understand changes in monetary policy from one policy rule to another.

¹⁴ This is the approach followed by Hakes (1990) and Gamber, Hakes and Shen (1998).

new observation to each new estimation not discarding old observations. And finally, I use a rolling regression technique¹⁶ that adds a new observation to each run but drops the last observation, therefore keeping the sample size unchanged. The first method is adequate when the investigator wants to test for breaks in specific dates. Because my objective is to analyzing how parameter estimates evolve over time without imposing breaking dates, this approach was not followed. The second method does provide time-varying parameters but since the sample size is constantly increasing, the impact of the last observation on estimated coefficients' size decreases as the researcher adds more observations to the sample. In fact, estimates generated early in the sample have larger standard errors relatively to those obtained for the whole sample. By using a rolling regression technique that keeps the sample size fixed, this shortcoming is overcome. I therefore decided to estimate monetary policy reaction functions by rolling regressions. The chosen sample size was ten years, because it is unlikely that policymakers consider the behavior of economic series relevant before that.

I started by estimating reaction functions for the U.S. and Germany since the objective of the empirical analysis is to test the hypothesis that these two countries provided an example of conservative monetary policies considered worth following by other E.U. countries. Furthermore, the central banks of these two countries have the greatest autonomy in policy management among the considered nations¹⁷ and, with Japan, are the leaders of monetary policymaking throughout the world.

¹⁵ Bohara and Sauer (1995) used Kalman filtering to estimate monetary reaction functions for the U.S. and Germany. Johnson and Siklos (1996) use a recursive regression approach to a vector autoregression (VAR) model in order to obtain proxies of policymakers' expectations about the state of the economy. They then estimate monetary policy reaction functions for seventeen OECD countries, but the coefficients are not allowed to vary over time.

¹⁶ Murchison and Siklos (1998) estimated reaction functions for a panel of 19 OECD countries. They use a rolling VAR to generate forecasts of unemployment and inflation, which are later incorporated in the reaction function. As in Johnson and Siklos (1996), their reaction function does not have time-varying parameters.

¹⁷ According to Blinder (1998, pp. 54) central bank independence means two things: "first that the central bank has freedom to decide how to pursue its goals, and second, that its decisions are very hard for any other branch of government to reverse." The *Bundesbank* is directed by law to "safeguard the currency," and the *Fed* is instructed to pursue "maximum employment," "stable prices" and "moderate long-term interest rates." For a comprehensive study of central bank independence on a large sample of countries see Cukierman (1992, ch. 19).

The *Bundesbank*, in particular, has a strong influence on monetary management within E.U. countries¹⁸ that are the focus of the analysis.

The policy reaction functions I present were based on the monetary policy rule proposed by Taylor (1993, 1998). The basic idea is that for each period (t-1), the central bank has a target for the monetary policy instrument¹⁹ determined by the state of the economy (stabilization objective). Taylor's proposed rule was the following:

$$\text{Equation 2 } R = p + gy + h(p - p^*) + r^*$$

where, R is a short-term interest rate, p is the yearly inflation rate and y is the percentage deviation of real output from trend. g and h measure, respectively, central bank responses to percentage deviations of output from trend and to inflation deviations from target (p^*). r^* stands for the real short-term interest rate target, that is, the real short-term interest rate that would prevail if inflation and output were at their targets.

In his 1993 paper, Taylor proposed a value of 2 for the inflation and the real short-term interest rate targets, but in his 1998 paper he presents estimates where the inflation target is assumed to be zero and the real short-term interest rate target is estimated. I start by estimating reaction functions for the U.S. and Germany based on Taylor's 1993 suggestions:²⁰

$$\text{Equation 3 } R_t = 2 + p_{t-1} + b(p_{t-1} - 2) + \phi_{t-1} + e_t$$

¹⁸ Issing (1997, pp. 77) states: "Germany's stability record (monetary policy) was the crucial factor in the Deutsche Mark becoming the anchor currency in Europe, which in turn allowed the *Bundesbank* to pursue a largely independent monetary policy. Whereas for other central banks exchange rate targeting assumed a key role, in Germany a monetary aggregate could consistently be used as the nominal anchor."

¹⁹ For most central banks, the main monetary policy instrument is a short-term interest rate. Typically, it is an interbank lending rate for overnight loans.

²⁰ Most papers on the subject, namely Friedman and Kuttner (1996), assume that the monetary policy instrument depends on past values of economic variables. Clarida, Gali and Gertler (1998-a, 1998-b), Clarida and Gertler (1996), Johnson and Siklos (1996) and Murchison and Siklos (1998) explicitly assume forward-looking central banks and use expected future values of the economic variables in their reaction function estimates. By employing lagged values of the policy objectives in the reaction functions, I do not exclude the hypothesis that central banks are forward looking because these lagged values are the most significant information used to form expectations about the future.

Where β and δ are now coefficients to be estimated and e_t is the disturbance term. According to the stabilization objective, the central bank is expected to lower short-term interest rates if real output lies below its trend level (a proxy for its potential level) and to raise them if inflation exceeds its target level. Therefore, a positive sign is expected for β , while a negative sign is expected for δ .

For the U.S., the dependent variable is the Federal Funds rate (FFR) since several authors [(Bernanke and Blinder, 1992; Bernanke and Mihov, 1998; Blinder 1998; Goodfriend, 1991)] have argued that, for the whole sample period, the FFR is the best indicator of monetary policy regardless of the actual operating procedure used by the Federal Reserve. In Germany,²¹ since December 1974, the *Bundesbank* has been pre-announcing targets for the growth in broad money. However, Bernanke and Mihov (1998) consider the *Bundesbank* to be better described as an inflation targeter than a money stock targeter. They found that the Lombard rate and the call money rate could not be rejected as monetary policy indicators. I therefore use the call money rate as dependent variable in German monetary policy reaction functions. Clarida and Gertler (1996) also argue that, despite the focus on monetary aggregates, short-term interest rates are the best indicators of the *Bundesbank's* monetary policy.

Turning to the independent variables, inflation rates were calculated as 12-month moving averages from Consumer Price Index series obtained from the IMF-IFS. To characterize the state of the real economy I used unemployment rates instead of output measures.²² Trends were obtained via the Hodrick-Prescott filter (Hodrick and Prescott, 1997) using all past observations. I follow common practice in setting the parameter I equal to 14400 in separating trends and deviations for monthly series. The setting of I determines how closely trend values track actual values of a series.

Unit-root tests (Dickey-Fuller, 1981; Phillips-Perron, 1988; Weighted Symmetric – Pantula, Gonzales-Farias, Fuller, 1994) were performed on short-term interest rates, inflation rates and

²¹ For an overview of monetary policymaking in Germany see Clarida and Gertler (1996), and Issing (1997).

²² This paper's focus on unemployment explains the decision to use unemployment rates instead of real output measures. If one accepts the Okun's law the two options are alternative. In fact, when measured for the whole period, the correlation between the percentage deviation of Industrial Production Index (GDP measures do not exist on a monthly basis) from trend and the deviation of unemployment from its trend level is 87% in the U.S. and 68% in Germany.

unemployment deviations from trend for the two countries. In all cases I was able to reject the unit-root hypothesis. When estimating Equation 3 for the U.S. and Germany, the error terms suffer from severe serial correlation, therefore generating biased standard errors. In order to obtain standard errors robust to autocorrelation I used the Newey and West (1987) correction method.

Results for the first set of estimations for the U.S. and Germany are presented in Figure 4 and Figure 5. Coefficient estimates are plotted along with two-standard-deviation intervals obtained by multiplying the standard error by plus or minus 1.96. Any point falling outside these bands is statistically significant at the 5% significance level. Recall that in each graph the coefficient estimate in a particular month corresponds to the estimate associated with that variable for the regression with the current month and the previous 119 months.

[Figure 4]

When looking at the graphs at least four things need to be highlighted. First, instability of parameter estimates over time does in fact exist. Just by adding a new observation to each run and dropping the last observation of the previous run, coefficient estimates sometimes vary considerably. Second, contrary to Taylor's predictions, the inflation coefficient (β_{US}) is statistically significant and negative for 10-year samples having their last observation between 1972 and 1983. A negative sign on β_{US} implies that when inflation rises, nominal FFR increase in a smaller proportion, decreasing real FFR. For the same time period the unemployment gap coefficient is statistically significant and negative. It therefore seems clear that monetary policy main objective during this period was to stabilize unemployment. It is important to notice that this period includes the inflation increases due to the first oil shock, suggesting that the Federal Reserve did not deliberately use monetary policy to reduce inflation. Third, the inflation coefficient is statistically significant and positive for samples with first/last observations between August 1980/August 1990 and June 1982/June 1992. This is probably capturing the Fed's strong response to increases in inflation after the second oil shock and may also reflect the monetarist experiment (1979 to 1982) under the chairmanship of Volcker. During this period the unemployment gap coefficient was statistically insignificant suggesting inflation as the

most important variable. Fourth, after this period the FFR does not react to inflation deviations from target but in some estimations it responds to unemployment deviations from trend.

The combination of the two graphs clearly suggests that U.S. monetary policy rule has changed considerably over time.²³ From the 60's to the beginning of the 80's the monetary policy threshold variable was unemployment,²⁴ while later, with exceptions for some time periods, it is more difficult to establish which of the two variables was the policy focus.

Estimations of Taylor's 1993-policy rule for Germany are presented in Figure 5. Similar to the results for the U.S., for the first years of the sample the inflation gap coefficient is negative (although almost never statistically significant) while the unemployment gap coefficient is statistically significant, negative and large. As in the U.S., unemployment deviations from trend were the main focus of monetary policy responses to the state of the economy. This probably reflects the dominance of Keynesian interventionist ideas during this period. The inflation gap coefficient rises constantly until it reaches a stable value of 0.4 (statistically different from zero) for estimations having their last observations after 1990. The opposite occurs with the unemployment gap coefficient, which decreases in absolute value, and in the last years of the sample stops being statistically significant.

[Figure 5]

The presented empirical evidence clearly shows the development of conservative monetary policies in Germany over time. Short-term interest rate responses to inflation have become more aggressive over time, while the reverse occurred with unemployment deviations from trend. Regarding the U.S. the evidence is less clear. Although results suggest unemployment as the most important variable in the first half of the sample, during the second half of the sample, with some time period exceptions, the FFR seems in general less responsive to deviations of inflation or

²³ Clarida, Galí, and Gertler (1998-a) also found evidence of substantial differences in the way monetary policy was conducted in the U.S. pre- and post-October 1979. They concluded that only after Volcker became Chairman of the Federal Reserve did controlling inflation become the main objective of monetary policy. Moreover, in pre-Volker years monetary policy was “accommodative” since the Federal Reserve would increase nominal interest rates by less than the increase in anticipated inflation, therefore decreasing real interest rates, while after October 1979 the Federal Reserve would raise real interest rates.

²⁴ This is in accordance to Gamber, Hakes and Shen (1998) results.

unemployment from target values. There is, however, a strong response in the 1980's to the second oil shock inflationary pressures.

In order to test the robustness of these results other specifications were estimated. The following step was to relax the assumptions for the target variables. In a 1998 paper, Taylor estimates his policy rule assuming a fixed zero inflation target over time and estimating the real short-term interest rate target.

$$\text{Equation 4 } R_t = \alpha + (1+b)p_{t-1} + \beta \pi_{t-1} + e_t$$

It is important to realize that in Taylor's policy rule only one of the target variables can be estimated. By assuming an inflation target of zero, the constant (α) reflects the monetary policy instrument target. However, if no assumptions are made about the inflation target, the same constant (α), in Equation 4, is the sum of two components: the monetary policy instrument target (r^*) and the negative of the inflation coefficient times the inflation target ($-\beta\pi^*$). The introduction of the constant in the model therefore makes coefficient estimates more difficult to interpret and a test of the development of conservative policy ideas more difficult to establish. In this specification, both the inflation coefficient and the constant reflect central bank concerns with inflation. Although not as clear as in the previous estimations, the results obtained with this specification²⁵ once more suggested stronger anti-inflationary monetary policy in the second half of the sample.

To refine the analysis I used a final specification, which allows for the central bank to have a smoothing objective on interest rates. Preliminary empirical work had suggested severe serial correlation in the error term, which is not surprising if we consider the monthly frequency of the series and the central bank objective for smoothing interest rates.²⁶ Taylor's specification only takes into account the stabilization objective. In reality, central banks typically do not adjust their monetary policy instrument immediately in response to new information and target changes usually occur in small steps. Taylor's policy rule can be extended to allow central banks to have a smoothing objective

²⁵ Results available from the author upon request.

when setting interest rates by including lags of the policy instrument [$h(L)R_{t-1}$] in the reaction function²⁷ and by substituting the one-month lagged yearly inflation rate by the one-month lagged monthly at annualized rate inflation (ap_{t-1}).²⁸

Equation 5 $R_t = a + h(L)R_{t-1} + bap_{t-1} + \phi_{t-1} + e_t$

Twelve and nine lags of the dependent variable were included in the U.S. and German specifications respectively.²⁹ Figure 6 presents U.S. results and Figure 7 German results.³⁰

[Figure 6]

As can be seen from the graphs, in the first years of the sample both the inflation and unemployment gap coefficient were statistically significant confirming the adoption of Keynesian interventionist policies. The Federal Reserve response to inflationary pressures generated by the first oil shock does not seem to have been strong. However, the Fed seems to have reacted more aggressively to the second oil shock pressures as the increase and statistical significance of the coefficients on annualized inflation (rolling samples from 1976-86 until 1980-90) suggest. In the last years of the sample the inflation coefficients stop being statistically significant, suggesting the jump in FFR after the second oil shock was not followed by a decrease in the same variable sufficiently large to bring real FFR to its previous levels. In fact, in the last years of the sample none of the variables is statistically significant at the 5% significance level.

[Figure 7]

²⁶ Goodfriend, (1991) suggests the minimization of surprise changes in rates and fear of disruption in financial markets as justifications for the smoothing objective.

²⁷ The optimal number of lags of the dependent variable was determined according to the Schwarz Bayesian Information Criterion. The Durbins'-h alternative was used to test for autocorrelation.

²⁸ $ap_{t-1} = [(1 + \min_{t-1})^{12} - 1] * 100$, where $\min_{t-1} = [(CPI_{t-1} - CPI_{t-2}) / CPI_{t-2}]$ and CPI stands for the consumer price index.

²⁹ For the U.S. model, with eleven lags there is evidence of autocorrelation in the residuals. When including the 12th lag the hypothesis of no autocorrelation can not be rejected and this lag is statistically significant. The 13th lag is not statistically significant. For Germany the 9th lag is statistically significant and the hypothesis of no autocorrelation can not be rejected. Including more lags in the model does not increase the adjusted-R squared.

³⁰ Only the coefficient estimates for inflation and the unemployment gap are presented in the paper. Results for the other variables estimated coefficients are available from the author upon request.

The evolution of estimated German inflation coefficients clearly shows the *Bundesbank's* strong response to inflation increases due to the two oil shocks. For estimations having the last observation after 1984 the coefficient is considerably smaller and for some estimations it is not even statistically significant. If we combine this observation with the evolution of German inflation presented in Figure 3, this suggests that increases in real short-term interest rates after the oil shocks were not followed by decreases in nominal short-term interest rates proportional to inflation decreases, leading to higher real interest rates. The *Bundesbank's* response to unemployment deviations from trend was much stronger in the first half of the sample than in the second, once more confirming a move towards conservative monetary policies.

3.1.2 *The Other European Union Countries*

To show that the other European Union nations also adopted conservative monetary policies after the second oil shock, Figure 8 presents data on yearly inflation rates and short-term nominal interest rates for each country.³¹ In all considered countries real short-term interest rates were much higher in the second half of the sample than in the first one. They increased considerably in the late 1970's and have been high since then, even though inflation rates in the 1990's have decreased to levels similar to the 1960's.

[Figure 8]

Recalling what has been said before, for the E.M.U. project to succeed governments had to consider exchange rate stability and inflation controls as primary goals. They had to abdicate from the use of monetary policy to fight national problems such as unemployment. The evidence presented in these graphs helps to document the adoption of conservative monetary policies that focus on inflation control.

³¹ To make results comparable across countries, data for the CPI and interest rates for all countries was extracted from the same source: the IMF-IFS. Regarding interest rates, I choose for each country the rate that applies to short-term borrowings between financial institutions. The IMF standardized name for this rate is the money market rate. The only exception is Ireland, for which the discount rate is used because the money market rate was only available for a short span of data [Johnson and Siklos (1996) used the same variable].

4 Conclusion

Empirical work on vote functions suggests that the percentage of votes incumbents had when elected and time in office consistently lead to a negative effect on the change in votes for incumbents. Among the economic variables, inflation, especially when measured relatively to the European average, appears as the main economic determinant of electoral results when variables are measured as 4-quarter averages in the last year in office. There is also evidence that voters reward governments for real GDP growth, especially when this variable is measured over the entire term in office. Although none of the real economic variables seems to have a strong effect on electoral outcomes, unemployment is statistically significant less often.

I argue that policymakers' understanding of the behavior of the economy plays an important role in determining electoral results, since it influences voters' perceptions of what macroeconomic policy can achieve and which objectives it should pursue. I therefore studied policymaker's attitudes towards unemployment and inflation. Four reasons were discussed for the creation of a neo-liberal consensus among leaders of E.U. countries: (1) the policy failure of Keynesian interventionist policies, of the full-employment type, after the first oil shock; (2) the development of monetarist ideas as a viable alternative to solve stagflation; (3) the example of Germany, which by adopting conservative monetarist policies managed to overcome the economic problems created by the oil shocks better than any other European state; and finally (4) the U.S. experience was also seen an example to follow, since the U.S. managed to overcome stagflation better than the average western European countries by adopting conservative policies, and has an independent central bank.

To test the last two arguments, time-varying monetary policy reaction functions, for the U.S. and Germany, from 1960 to 1998, were estimated using a rolling regression technique. For both countries there is strong evidence that monetary policy responses to unemployment deviations from trend decreased considerably over time and that during the first years of the sample unemployment was the main focus of monetary policy. Both in the U.S. and Germany real interest rates are much higher in the 1980's and 1990's than in the 1960's and 1970's. There is also evidence that in general, all E.U. nations adopted policies of high real short-term interest rates at the end of the 1970's. This

change in policies suggests that among policymakers, the unemployment aversion that existed before the 1970's as a consequence of the Great Depression has been replaced by inflation concerns after the 1970's due to a series of supply side shocks and the willingness to achieve monetary integration.

I consider the development of this neo-liberal consensus among European leaders and the willingness to achieve monetary union as possible explanations for governments to go unpunished for the increase and persistence of unemployment in Europe. On one hand, the change from interventionist Keynesian ideas to market-oriented policies has decreased governments' responsibility for macroeconomic outcomes. On the other hand, the willingness to achieve monetary integration gave politicians an entity, the E.M.U., to blame for domestic problems. The need to reduce inflation and keep exchange rates stable has been used as a justification for the non-adoption of expansionary macroeconomic policies. Expansionary fiscal policies are directly constrained by the need to achieve fiscal consolidation, expansionary monetary policies are unacceptable because of the inflation convergence objective. Therefore, the willingness to achieve monetary union and the fact that most European countries are facing the same problem has made governments less responsible for unemployment.

Although unemployment has always been present during electoral campaigns, it is seen as a necessary evil to achieve monetary integration. This argument has been used alike by left and right-wing governments and this may be why empirical results on vote functions don't show any clear evidence that voters hold incumbents from different ideologies more responsible for certain economic variables than others. Recently, as convergence on low inflation rates seems to have been achieved and the E.M.U. began in 1999, political concerns about unemployment have again increased as the election of left-wing governments in the 1997 French and English elections and in the 1998 German election seem to suggest. However, it is most likely that the measures adopted to decrease it will rely on reducing labor market rigidities.

An increase on the information and debate around E.M.U. is certainly desirable since it will have major consequences in voters' lives. The European central bank started defining monetary policy for E.U. members in January 1999, monetary policy is ruled out as an instrument governments can use to influence national macroeconomic outcomes, and it is difficult for European citizens to influence

the bank's policies. The E.M.U.'s success with economic policy, especially on national unemployment problems, will be critical to its political support and therefore, to its continuity and progress.³²

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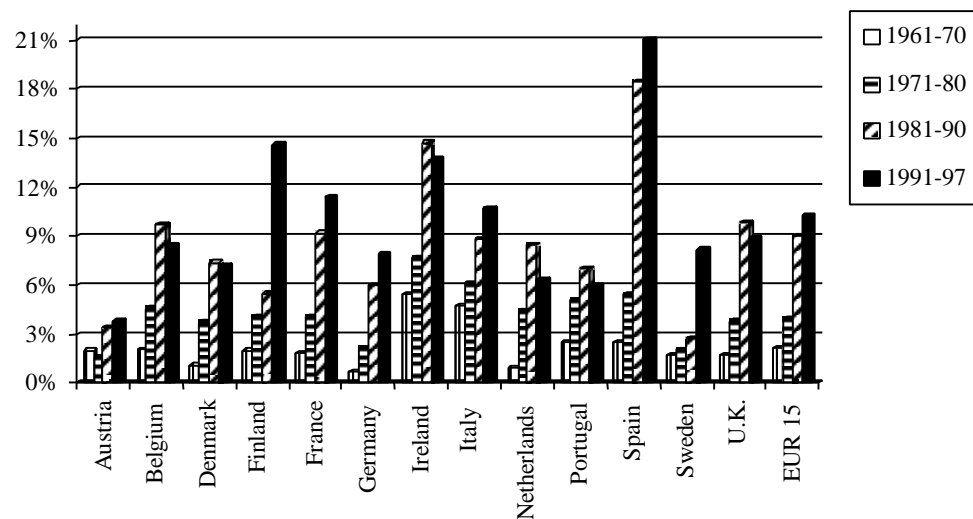
³² See Obstfeld (1997) on the Europe's gamble.

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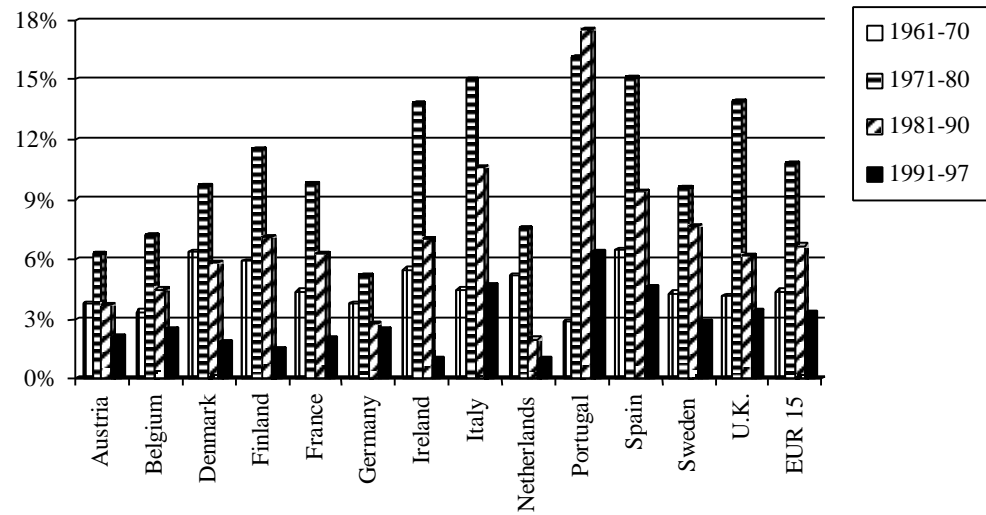
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Figure 1 Average Unemployment by Decades



Source: European Commission, *European Economy*, n. 64, 1997.

Figure 2 Average Inflation Rates by Decades



Source: European Commission, *European Economy*, n. 64, 1997.

Table 1 Vote Functions: 4-Quarter Averages of Economic Variables

Vote share in preceding election	-.27*** (-4.0)	-.27*** (-3.8)	-.17** (-2.0)	-.26*** (-3.9)	-.27*** (-3.9)
Quarters in office	-.44*** (-2.8)	-.40*** (-2.6)	-.69*** (-3.1)	-.45*** (-2.9)	-.38** (-2.6)
<i>Economic performance variables</i>					
Changes in Inflation	-5.61* (-1.8)	-5.15** (-2.2)	-3.38 (-.8)		
Changes in Unemployment	-2.70 (-1.0)				
Real GDP Growth Rate		1.66* (1.9)			
Real Private Consumption Growth Rate			1.66 (1.2)		
Changes in Relative Inflation				-7.40** (-2.2)	-6.99*** (-2.8)
Changes in Relative Unemployment				-.14 (-.04)	
Relative Real GDP Growth Rate					1.21 (1.2)
Adjusted R-squared	0.276	0.282	0.179	0.286	0.299

Notes: The coefficients on the dummies included to control for fixed effects are not reported.
t-statistics are in parentheses.

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

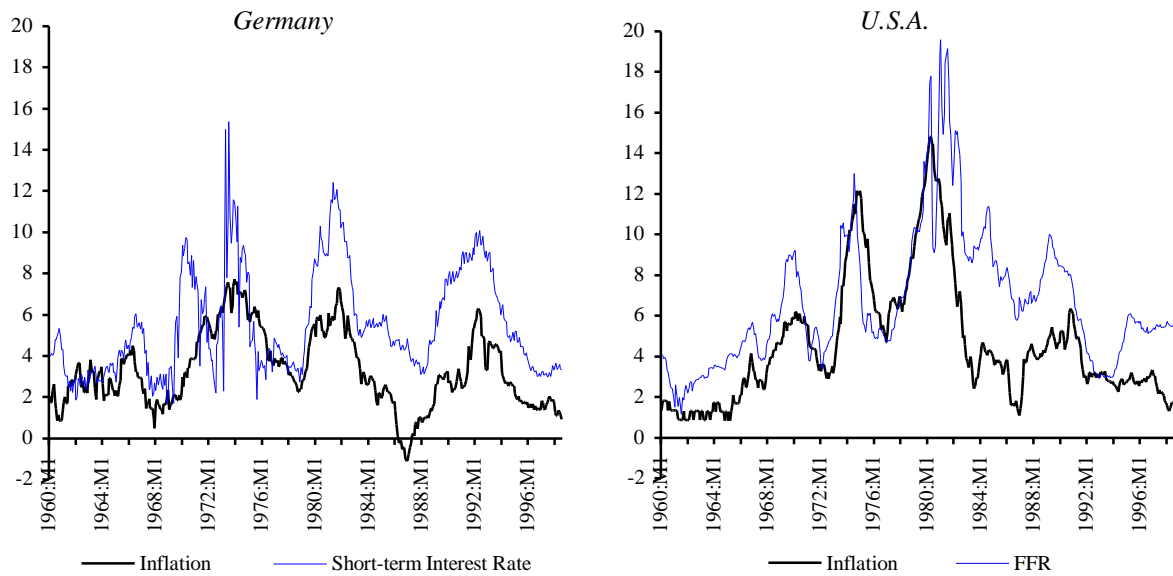
Table 2 Vote Functions: Entire Period in Office

Vote share in preceding election	-.30*** (-3.8)	-.34*** (-4.3)	-.15* (-1.8)	-.28*** (-3.5)	-.30*** (-3.8)
Quarters in office	-.44** (-2.4)	-.40** (-2.5)	-.75*** (-3.4)	-.43** (-2.3)	-.37** (-2.3)
<i>Economic performance variables</i>					
Changes in Inflation	.47 (.07)	-1.70 (-.3)	2.88 (.4)		
Changes in Unemployment	-1.23 (-1.3)				
Real GDP Growth Rate		1.92** (2.1)			
Real Private Consumption Growth Rate			1.78* (1.9)		
Changes in Relative Inflation				-3.61 (-.4)	-3.78 (-.7)
Changes in Relative Unemployment				1.01 (.1)	
Relative Real GDP Growth Rate					1.10 (.9)
Adjusted R-squared	0.213	0.270	0.223	0.202	0.245

Notes: The coefficients on the dummies included to control for fixed effects are not reported.
t-statistics are in parentheses.

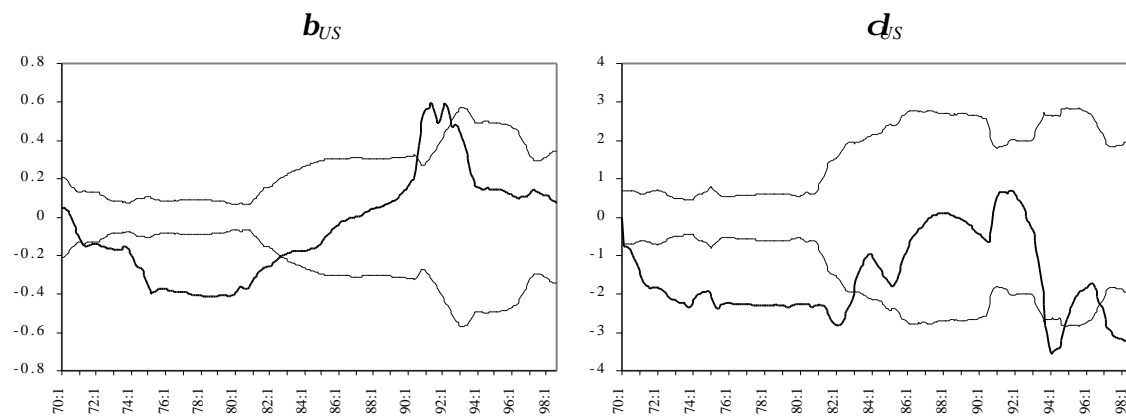
*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Figure 3 Inflation and Nominal Interest Rates³³



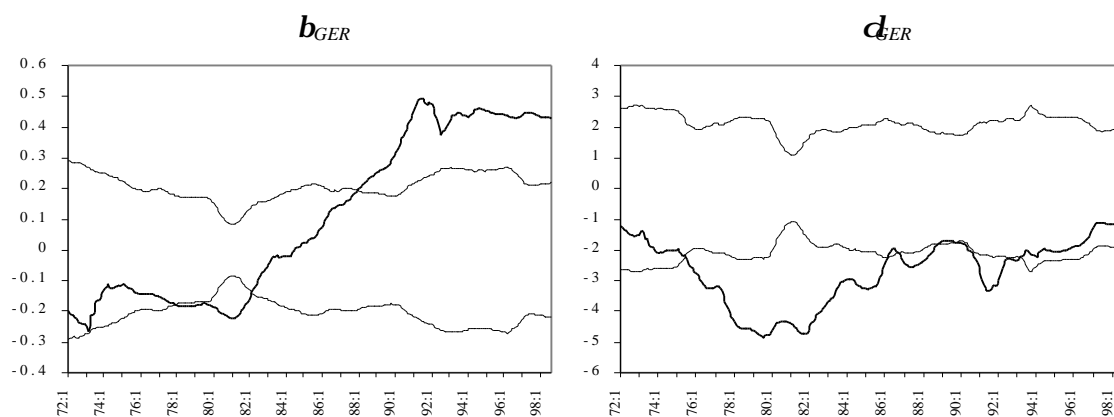
³³ Interest rates are annualized monthly rates. Inflation rates are annual and calculated from monthly consumer price indexes.

Figure 4 Taylors' Policy Rule ($r^*=2$ and $\pi^*=2$) for the U.S.



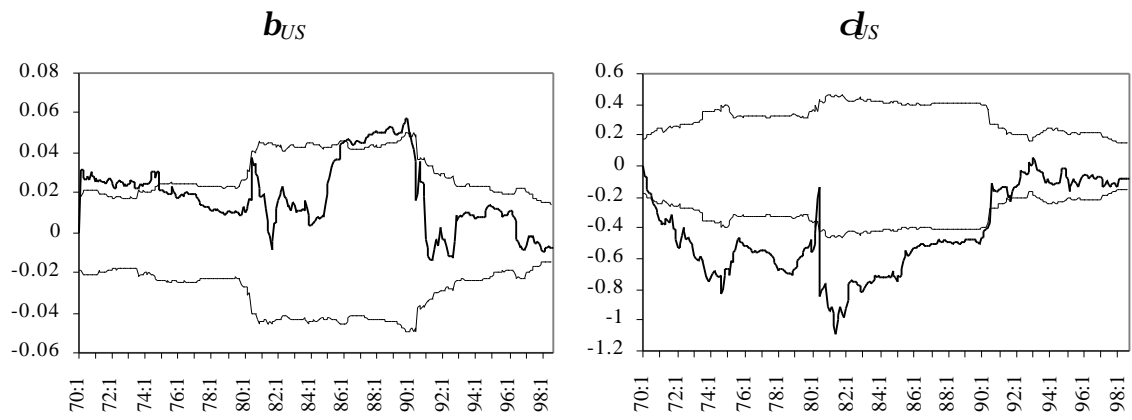
Notes: The boldface series represent coefficient estimates, the other series are two-standard-deviation intervals ($\pm 1.96 \cdot SE$).

Figure 5 Taylors' Policy Rule ($r^*=2$ and $\pi^*=2$) for Germany



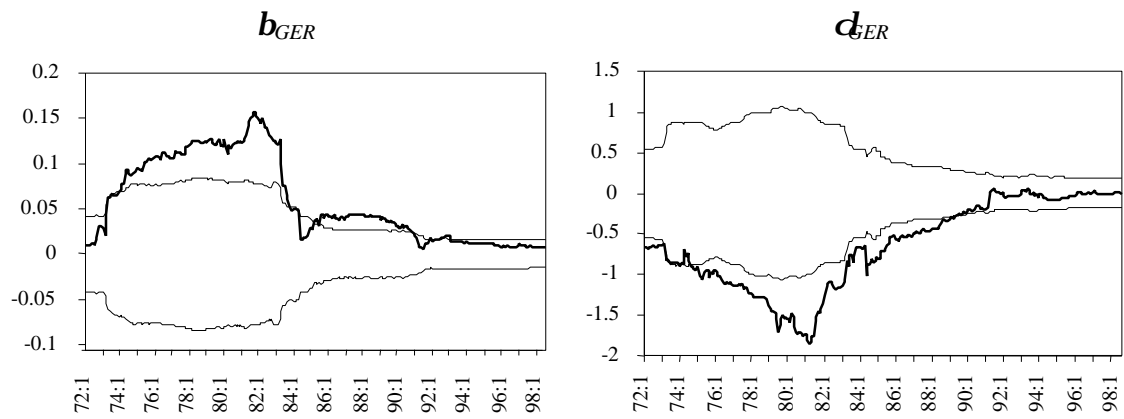
Notes: The boldface series represent coefficient estimates, the other series are two-standard-deviation intervals ($\pm 1.96 \cdot SE$).

Figure 6 Taylor's Rule for the U.S. Admitting a Smoothing Objective



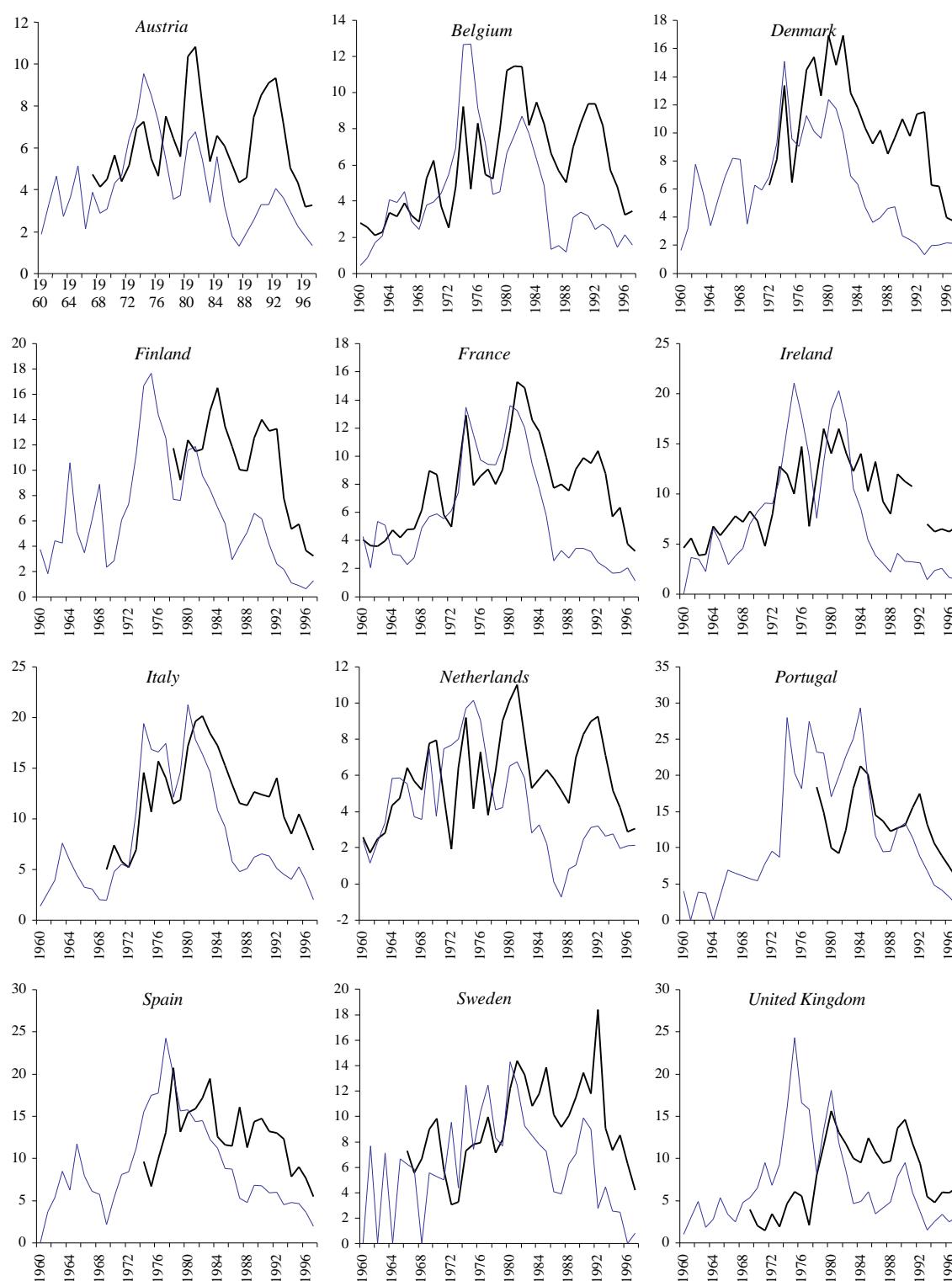
Notes: The boldface series represent coefficient estimates, the other series are two-standard-deviation intervals ($\pm 1.96 \times SE$).

Figure 7 Taylor's Rule for Germany Admitting a Smoothing Objective



Notes: The boldface series represent coefficient estimates, the other series are two-standard-deviation intervals ($\pm 1.96 \cdot SE$).

Figure 8 Inflation and short-term nominal interest rates



Notes: Data is annual and was obtained from the IMF-IFS. Boldface series represent short-term interest rates, other series are annual inflation rates calculated from the Consumer Price Index.